REMARKS

Claims 1 to 13 and 24 to 29 are currently pending, with claims 14 to 20, 23 and 30 to 51 having been previously withdrawn in response to a restriction requirement. Applicants thank the Examiner for allowing claims 1 to 11, 13 and 24 to 29. Reconsideration of the patentability of the pending claims is respectfully requested in view of the foregoing the following discussion.

Claim 12 was rejected under 35 U.S.C. §103(a) as unpatentable over Nystrom in view of U.S. Published Patent Application No. 2001/0050962 to Adachi et al. ("Adachi").

Claim 12 relates to a method of reducing the transmitted power of a quadrature modulated optical data signal. Claim 12 recites providing a quadrature modulated optical data signal, and during ***all*** transitional states of the quadrature ***modulated*** optical data signal in which the ***data symbols*** can change in value, reducing the power to zero such that transmitted power decreases to zero at approximately a mid point of ***each*** of the transitional states.

As previously explained in Applicants' Amendment mailed February 8, 2006 (and filed February 10, 2006), Nystrom and Adachi, either alone or combined, do not teach or suggest these features, and moreover Nystrom provides a teaching for avoiding zero crossings of output power in an I-Q constellation.

In response, the present Office Action asserts on page 3 that Fig. 1, col. 1, lines 16 to 28, col. 2, lines 60 to 67, and col. 3, lines 1 to 14, of the Nystrom reference disclose the features of claim 12 with respect to "during all transition states of the quadrature modulated data signal in which data symbols can change in value, reducing the power to zero such that transmitted power decreases to zero at approximately a mid point of each of the transitional states." Applicants respectfully disagree for the following reasons.

In Fig. 1 and col. 1, lines 16 to 28, Nystrom refers to a quadrature network 140, at whose input is a sinusoidal signal, which can be described by the formulaic relation A*cos(2π*freq), where "A" represents the amplitude of the sinusoidal signal and "freq" represents its frequency. In Fig. 1, amplitude A is shown with a deterministic value A=1. Since Nystrom states the sinusoid period is "2x", and since frequency is inversely proportional to the period, the frequency of the signal in this instance is derived to be freq=1/2x, which is also deterministic. Likewise, since the phase of a cosine signal is considered to be exactly zero degrees, the phase of the input signal is deterministic as well. Accordingly, all aspects (i.e., the amplitude, frequency or phase) of the input signal are deterministic.

In this regard, the amplitude, frequency and/or phase of the input signal may be modulated (e.g., "imprinted with information") in order to obtain a modulated signal (sometimes also referred to as "the information carrying signal"). However, in Fig. 1 this is not the case since the quadrature network outputs provide a "in-phase signal" strictly according to the relation A/sqrt(2) * cos(2π*freq), and a "quadrature phase signal" strictly according to the relation A/sqrt(2) * sin(2π*freq) = A/sqrt(2) * cos(2π*freq - π/2), and thus no modulation is taking place. As a result, without modulation ***there are no data symbols*** introduced into theses signals (i.e, ***the signals do not carry any modulated information***). This is because the only two changes that are taking place in the quadrature network 140 of Fig. 1 are deterministic. In particular, the two deterministic changes are: (1) the amplitude of the output signals 110, 120 of the quadrature network 140 is reduced by a factor 1/sqrt(2) for total-power-conservation reasons, in order to reflect that exactly one half of the input power goes to each of the two outputs; and (2) one of the outputs is shifted by deterministic phase π/2 = 90 degrees with the respect to the other (i.e., in Fig. 1, the output labeled 120 is "lagging" the output labeled 110 by 90 degrees).

Accordingly, since all the signals shown in Fig. 1 are deterministic, that is, such signals are unmodulated and do not carry any information, and since claim 12 requires that a state transition of a modulated signal occur with respect to the data symbols that can change in value (i.e., a transition in the information-carrying signal), there are no grounds for describing the transitional states with the respect to any zero crossings in Fig. 1.

To a person having ordinary skill in the art, the two outputs are known as "the Local Oscillator (LO) in-phase cosine wave" and "the LO quadrature sine wave", and are actually presented as such in Figure 5(a), as outputs of the quadrature network labeled "420" (See col. 3, lines 6 to 12, in particular, see line 12 in which Nystrom refers to the two outputs as "the local oscillator carriers". Incidentally, col. 3, line 8 includes a typo: "wave from network **42** and..." should read as "wave from network **420** and...")

As stated in col. 2, line 68 to col. 3, line 6, the LO in-phase cosine wave and the LO quadrature sine wave are mixed with the data streams "I" and "Q" using mixers 405 and 410. I and Q are described in col. 2, lines 60 to 67, where Nystrom teaches that the information-carrying signals are separated into two individual data streams – "I" for in-phase digital data stream 425, and "Q" for quadrature data stream 430, as shown in Fig 5(a).

In col. 3, lines 10 to 14, Nystrom teaches that the I & Q information signals modulate the local oscillator in-phase and quadrature carriers to produce a single QPSK (quadrature phase-shift keying) modulated output signal, and in col. 3, lines 25 to 27,

Nystrom teaches that the QPSK modulation produces a four-point constellation 485, shown in Fig. 5(c). It is this QPSK constellation shown in Fig. 5(c) that represents the information-carrying aspect of the modulation format.

In this regard, col. 3, lines 27 to 31 of Nystrom state that the QPSK constellation of Fig. 5(c) has a property to ***occasionally*** swing through zero output power. In particular, according to Fig. 5(c), the QPSK constellation swings through the zero output upon a state transition from (0,1) to (1,0), (1,0) to (0,1), (1,0) to (0,1), or (0,1) to (1,0), but does not swing through the zero output for the remaining state transitions of (0,1) to (0,0), (0,1) to (1,1), (0,0) to (1,0), (0,0) to (0,1), (1,0) to (0,0), (1,0) to (1,1), (1,1) to (0,1), and (1,1) to (1,0).

By contrast, claim 12 provides that during ***all*** transition states of the quadrature modulated data signal the power is reduced to zero such that transmitted power decreases to zero at approximately a mid point of ***each*** of the transitional states, which is exemplified in Fig. 3 of the present application. In particular, Fig. 3 shows a QRZ (Quadrature Return to Zero) constellation, in which for any transition from one to state to another the constellation swings through zero power.

Accordingly, for at least these reasons, the cited references do not render obvious the subject matter of claim 12, and therefore claim 12 is allowable.

CONCLUSION

In light of the foregoing, Applicants respectfully submit that all pending claims 1 to 13 and 24 to 29 are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

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